

*ABSTRACT*

A mode-locked laser serves as a light source for stabilizing the frequency of each optical carrier and generates high-quality optical multi-carrier. The mode-locked laser is equipped with a master laser for generating master laser light; a mode-locked laser section 5 including in an optical resonator at least a modulating section, an amplifying section, and a bandwidth limiting section for reducing mode partition noise; and a signal generating section for generating a periodic signal that serves for mode locking of the mode-locked laser section and is to be applied to the modulating section. The master laser light is input to the optical resonator of the mode-locked laser section to cause injection locking. An optical multi-carrier 10 source is constructed by combining this mode-locked laser with a waveguided optical nonlinear medium.